CLEAN JOBS PENNSYLVANIA

86,285 CLEAN ENERGY JOBS ACROSS PENNSYLVANIA[1]

POWERING PENNSYLVANIA'S ECONOMIC RENEWAL

From rural areas like the Laurel Highlands to big cities like Philadelphia and Pittsburgh, clean energy workers are a growing and visible part of the state's economy. They build wind farms, develop equipment and parts for solar and wind companies and retrofit schools, homes and businesses to make them more energy efficient. At a time of growing income inequality across the nation, these jobs earn family-sustaining wages and salaries. Energy efficiency is by far the biggest clean energy employer in the state, with more than **65,000** jobs. Meanwhile, more than **8,500** Pennsylvanians work in renewable energy industries like solar and wind, while nearly **7,000** work in at companies that make cleaner cars like hybrids and electric vehicles.

CLEAN ENERGY JOBS IN PERSPECTIVE

All

67 Counties

in Pennsylvania have residents working in clean energy

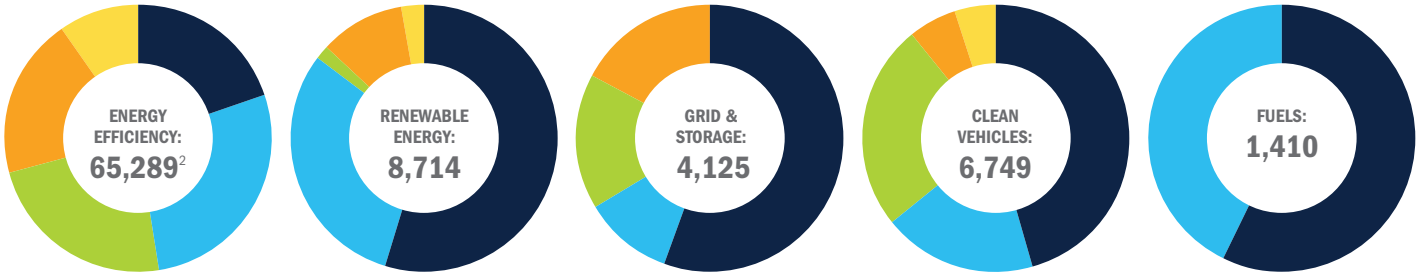
#11

Pennsylvania ranks 11th among all 50 states and D.C. in clean energy jobs

42%

of all Pennsylvania clean energy workers are involved in construction

INDUSTRY BREAKDOWN



- ENERGY STAR & Lighting: **12,985**
- Trad. HVAC: **18,084**
- High-Efficiency HVAC & Renewable H&C: **15,184**
- Adv Materials: **12,833**
- Other: **6,203**

- Solar: **4,777**
- Wind: **2,677**
- Geothermal: **133**
- Bioenergy/CHP: **906**
- Low-Impact Hydro: **221**

- Storage: **2,297**
- Smart Grid: **446**
- Micro-Grid: **683**
- Other Grid Modernization: **699**

- Hybrid Electric Vehicles: **3,084**
- Plug-In Hybrid Vehicles: **1,250**
- Electric Vehicles: **1,701**
- Natural Gas Vehicles: **381**
- Hydrogen & Fuel Cell: **333**

- Other Ethanol/ Non-Woody Biomass: **810**
- Other Biofuels: **600**

PRESENTED BY:

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JUNE 2018
E2FS: 18-06-A

For more information, contact **Noah Dubin** at **ndubin@e2.org**. For questions regarding this report, visit E2's Clean Jobs America FAQ at www.e2.org/cleanjobsamerica/FAQ.

E2 would like to thank Sharon Pillar for making the Clean Jobs Pennsylvania issue brief possible.

CLEAN JOBS COUNT E2

IN PARTNERSHIP WITH:

KEEA KEYSTONE ENERGY EFFICIENCY ALLIANCE

sbn Sustainable Business Network of Greater Philadelphia

Sustainable Pittsburgh

GREEN BUILDING ALLIANCE

POLICIES MATTER

Pennsylvania's renewable energy policies are weak compared to those of its neighbors and better policies would lead to more clean energy jobs in the Commonwealth. Under the state's 2004 Alternative Energy Portfolio Standard, just 8 percent of electricity sales must come from "Tier 1" resources (including renewables) by 2021, with 0.5 percent from solar.

Although Pennsylvania is home to more than 17,000 solar installations and numerous wind farms, only about 5 percent of the commonwealth's electricity comes from renewable energy—far less than in neighboring states.

Pennsylvania's main energy efficiency policy, Act 129, has delivered $6.4 billion in benefits to Pennsylvania electric customers since 2009 and saved the amount of electricity consumed by roughly 330,000 Pennsylvania households each year. According to a report issued by the Pennsylvania Public Utility Commission, for every $1 invested in energy efficiency over the past three years, Pennsylvania electricity customers have realized $1.70 in benefits.[2]

Recent polices (including Act 40), updates to the state's building energy codes, and new Commercial Property Assessed Clean Energy (C-PACE) legislation are moving Pennsylvania in the right direction. But more needs to be done to keep Pennsylvania's clean energy economy—and the jobs that come with it—growing.

Lawmakers in Harrisburg and Washington, D.C. can:

// **Increase the requirement for renewable energy in the AEPS.** While the AEPS was a forward-looking policy when it passed in 2004, most states have since set far more aggressive renewable energy portfolio standards, realizing the tremendous job growth potential. New York and New Jersey both now have state goals of 50 percent renewables by 2030, and Maryland is 25 percent by 2020 with a 2.5 percent goal for solar. With half the population of Pennsylvania, the state of Massachusetts has nearly 20,000 solar jobs, in large part because it has some of the best clean energy policies in the country.[3]

// **Lift the energy efficiency investment cap on utilities.** Under current law, utility investment in energy efficiency programs is limited to 2 percent of each utility's 2006 total revenues. As a result, the state's electricity usage has only been reduced by about 0.8 percent annually. But the PUC's Statewide Evaluator has found that those savings could be doubled up to 2 percent, if the cap were removed.

// **Permit community shared solar in Pennsylvania.** Pennsylvanians who do not have access to solar on their own property can participate in a solar installation elsewhere and be credited for that solar production directly on their electric bill. The legislature should change the virtual net-metering regulations to permit community solar and include provisions that encourage the inclusion of low- to moderate-income individuals in community solar programs.

// **Adopt policies to support more electric vehicles.** Increasing the use of electric vehicles (EVs), together with cleaning up the electricity grid, is critical for reducing carbon pollution to mitigate climate change. But adoption of EVs has been slow in Pennsylvania due to a lack of charging infrastructure. Maximizing investments in charging infrastructure under the Volkswagen settlement and legislation like House Bill 1446, which would give utilities more ability to build charging stations, will both reduce air pollution and grow jobs in Pennsylvania's clean transportation sector.

// **Implement carbon limits and a carbon pricing program that invests in renewable energy and energy efficiency measures.** One option would be for Pennsylvania to participate in the Regional Greenhouse Gas Initiative (RGGI), which caps and prices CO_2 pollution from the electricity sector. New Jersey and Virginia are expected to join nine other Northeastern states where power sector CO_2 pollution has decreased more than 45 percent since 2005. The RGGI state economies have expanded, and RGGI investments have returned billions of dollars of energy savings to households and businesses and supported significant renewable energy development.[4]

// **The state's PUC should issue a strong policy statement on alternative ratemaking that prioritizes energy efficiency and distributed renewable energy.** Under the current utility business model, when customers become more energy efficient or install distributed generation on their property, the utility's revenues decrease. To combat this disincentive, many states have successfully adopted alternative ratemaking policies that financially incentivize utilities to help customers use less energy. In a significant step, the PA Public Utility Commission recently released a proposed policy statement inviting utilities to submit rate proposals that would better align with the goals of energy efficiency and distributed generation. To ensure the market for energy efficiency and distributed energy continues to grow, the PUC should make it clear in its Final Policy Statement that utility rates should incentivize the deployment of energy efficiency and other clean energy technologies.

CLEAN JOBS BY VALUE CHAIN

- Construction: 42.5%
- Manufacturing: 21.3%
- Trade: 13.3%
- Other Services: 15.5%
- Professional Services: 6.0%
- Agriculture and Forestry: 1.1%
- Utilities: 0.4%

TOP 5 METRO AREAS FOR CLEAN ENERGY JOBS

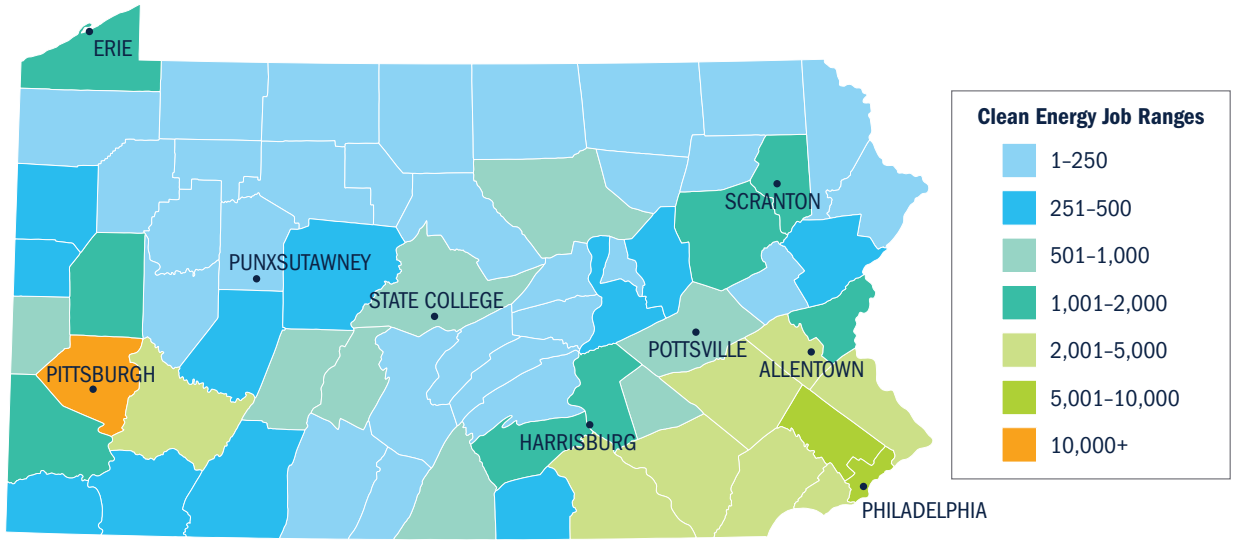
Metro Area (MSA)	Clean Energy Jobs*	Renewable Energy Jobs	Energy Efficiency Jobs
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	28,655	2,767	21,753
Pittsburgh, PA	17,178	1,659	12,992
Allentown-Bethlehem-Easton, PA-NJ	4,461	370	3,434
Harrisburg-Carlisle, PA	3,807	327	2,910
Scranton—Wilkes-Barre, PA	3,695	320	2,822

* Total includes all clean energy jobs categories, including solar, wind, energy efficiency, clean vehicles, battery storage, advanced biofuels, low-impact hydro and other areas.

TOP COUNTIES

County	Clean Energy Jobs*
Allegheny	11,720
Philadelphia	8,957
Montgomery	8,908
Bucks	4,881
Chester	4,806
Lancaster	4,276
Berks	3,409
Delaware	3,277
York	3,202
Lehigh	2,445

CLEAN ENERGY JOBS COUNTY HEAT MAP



PROFILE: WORKING IN SOLAR

NAME:
Lemuel Coleman

COMPANY:
Scalo Solar Solutions LLC

LOCATION:
Pittsburgh

POSITION:
Solar Installer

TIME IN POSITION:
1 year

HOW DID YOU BECOME A SOLAR INSTALLER?
"I started with Burns & Scalo Roofing, the parent company of Scalo Solar, in their wall panel division about a year and half ago. There was an increase in solar installations, so I was given the option to move over into the solar division and get trained. I thought it would be an interesting new environment. It was an easy transition. The most difficult thing about working on roofs is the weather, and I wasn't as used to working on roofs as some of the other guys who came from the roofing division. I'm very careful up there, and we have had to learn a lot of safety procedures. But when the solar is installed, it is really something to see. I'm glad I made the transition."

WHAT DO YOU LIKE ABOUT WORKING IN SOLAR?
"I like the concept of solar. It's basically using the free energy from the God-given sun. It's energy that can be stored and used later. Solar saves people money—it's a not a just a cost, it's an investment. I like that we are helping people. Eventually, it will be installed on everything, not just our roofs but on our cars, on walls, even on our devices. It will be everywhere. Solar is the future."

CASE STUDY: SOLAR EQUIPMENT MANUFACTURING

PIONEERING MONTGOMERY COUNTY COMPANY'S PENNSYLVANIA SUPPLY CHAIN CREATES JOBS IN SOLAR, POWER STORAGE AND MANUFACTURING

Inside an unassuming office park in suburban Philadelphia, a handful of Pennsylvania's 85,000 clean energy workers are helping pioneer electrical hardware that improves the performance and lowers the cost of clean energy technologies like solar power and batteries.

Alencon Systems LLC—an abbreviation for "alternative energy conversion"—employs about a dozen people at its office in Hatboro, located in Montgomery County about 20 miles north of downtown Philadelphia. Founded in 2009, most of Alencon's workers are mechanical and electrical engineers or software developers, with a small but growing sales and commercial team.

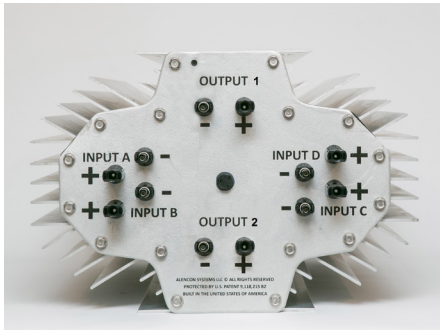
Alencon is in the power electronics business. It designs solar power equipment like inverters and DC-DC optimizers. To the untrained eye, the inverters look like unassuming, gray metal boxes. However, inside are sophisticated electrical components and cutting-edge engineering concepts protected by U.S. and international patents.

Alencon's products are truly "Made in Pennsylvania." While Alencon designs the products in Montgomery County, the company relies on a Central Pennsylvania-based business to actually manufacture its devices and the electrical hardware they contain. Alencon's products are then installed at solar projects across the country and even on military bases.

According to the company: "Alencon is committed not only to manufacturing its products in the U.S., but here in Pennsylvania. We believe that with our strong, Pennsylvania-based supply chain, we can make a high-quality product at a competitive price with the shortest possible lead times from order to shipment."

One of Alencon's main products is called SPOT. Recently, several SPOT DC-DC optimizers were installed in a major solar project in the Southeastern U.S. At this site, Alecon's inverter helps regulate the voltage between the project's solar PV panels and a large, 4 megawatt-hour battery, as well as the solar system's grid-tied inverter. By helping integrate solar PV with energy storage in this way, Alencon claims it can make both technologies more financially viable, more efficient and safer.

Alencon's power electronics hardware installed at a solar array. (Photo courtesy of Alencon)



A close-up of an Alencon product designed in Montgomery County and manufactured at a facility in Central Pennsylvania. (Photo courtesy of Alencon)

PENNSYLVANIA CLEAN ENERGY EMPLOYMENT BY DISTRICT

U.S. CONGRESSIONAL DISTRICT

District	Clean Energy Jobs*	Renewable Energy Jobs	Energy Efficiency Jobs
1 (Rep. Brady)	5,670	572	4,279
2 (Rep. Evans)	4,211	367	3,226
3 (Rep. Kelly)	5,736	466	4,424
4 (Rep. Perry)	5,603	461	4,321
5 (Rep. Thompson)	3,433	291	2,645
6 (Rep. Costello)	8,863	860	6,786
7 (vacant)	5,946	582	4,506
8 (Rep. Fitzpatrick)	6,541	657	4,966
9 (Rep. Schuster)	4,904	406	3,775
10 (Rep. Marino)	5,294	433	4,078
11 (Rep. Barletta)	3,547	315	2,713
12 (Rep. Rothfus)	6,019	710	4,465
13 (Rep. Boyle)	1,377	115	1,059
14 (Rep. Doyle)	6,144	528	4,713
15 (vacant)	5,341	1,169	3,546
16 (Rep. Smucker)	2,922	386	2,137
17 (Rep. Cartwright)	2,089	185	1,597
18 (Rep. Lamb)	2,645	212	2,051

PENNSYLVANIA CLEAN ENERGY JOBS BY DISTRICT

STATE SENATE

District	Clean Energy Jobs
1 (Sen. Farnese)	4,722
2 (Sen. Tartaglione)	1,060
3 (Sen. Street)	353
4 (Sen. Haywood III)	1,773
5 (Sen. Sabatina)	235
6 (Sen. Tomlinson)	3,670
7 (Sen. Hughes)	1,658
8 (Sen. Williams)	481
9 (Sen. Killion)	4,412
10 (Sen. McIlhinney)	2,469
11 (Sen. Schwank)	2,266
12 (Sen. Greenleaf)	1,232
13 (Sen. Martin)	2,696
14 (Sen. Yudichak)	2,134
15 (Sen. DiSanto)	2,253
16 (Sen. Browne)	2,388
17 (Sen. Leache)	3,001
18 (Sen. Boscola)	1,484
19 (Sen. Dinniman)	1,669
20 (Sen. Baker)	1,533
21 (Sen. Hutchinson)	2,257
22 (Sen. Blake)	1,649
23 (Sen. Yaw)	1,977
24 (Sen. Mensch)	1,035
25 (Sen. Scarnati)	1,397

District	Clean Energy Jobs
26 (Sen. McGarrigle)	668
27 (Sen. Gordner)	1,141
28 (Sen. Wagner)	2,348
29 (Sen. Argall)	931
30 (Sen. Eichelberger)	2,423
31 (Sen. Regan)	1,561
32 (Sen. Stephano)	1,491
33 (Sen. Alloway)	813
34 (Sen. Corman)	1,216
35 (Sen. Langerholc)	1,082
36 (Sen. Aument)	1,016
37 (Sen. Reschenthaler)	4,328
38 (Sen. Vulakovich)	1,889
39 (Sen. Ward)	2,274
40 (Sen. Scavello)	948
41 (Sen. White)	1,768
42 (Sen. Fontana)	2,778
43 (Sen. Costa)	667
44 (Sen. Rafferty)	388
45 (Sen. Brewster)	474
46 (Sen. Bartolotta)	1,491
47 (Sen. Vogel)	1,354
48 (Sen. Folmer)	707
49 (Sen. Laughlin)	1,710
50 (Sen. Brooks)	1,011

STATE HOUSE

District	Clean Energy Jobs
1 (Rep. Harkins)	748
2 (Rep.Fabrizio)	614
3 (Rep. Bizzarro)	294
4 (Rep. Sonney)	119
5 (Rep. Jozwiak)	1,028
6 (Rep. Roae)	477
7 (Rep. Longietti)	464
8 (Rep. Nesbit)	713
9 (Rep. Sainato)	516

District	Clean Energy Jobs
10 (Rep. Bernstine)	389
11 (Rep. Ellis)	311
12 (Rep. Metcalfe)	595
13 (Rep. Lawrence)	673
14 (Rep. Marshall)	408
15 (Rep. Christiana)	626
16 (Rep. Matzie)	395
17 (Rep. Wentling)	17
18 (Rep. DiGirolamo)	843

STATE HOUSE CONTINUED

District	Clean Energy Jobs
19 (Rep. Wheatley)	2,968
20 (Rep. Ravenstahl)	826
21 (Rep. Costa, D)	501
22 (Rep. Schweyer)	854
23 (Rep. Frankel)	190
24 (Rep. Gainey)	374
25 (Rep. Markosek)	759
26 (Rep. Hennessey)	1,007
27 (Rep. Deasy)	1,009
28 (Rep. Turzai)	315
29 (Rep. O'Neill)	1,116
30 (Rep. English)	31
31 (Rep. Warren)	1,061
32 (Rep. DeLuca)	451
33 (Rep. Dermody)	198
34 (Rep. Costa, P)	286
35 (Rep. Davis, A)	616
36 (Rep. Readshaw)	246
37 (Rep. Fee)	1,975
38 (Rep. Kortz)	72
39 (Rep. Saccone)	698
40 (Rep. Maher)	792
41 (Rep. Miller, B.)	439
42 (Rep. Miller, D.)	<10
43 (Rep. Greiner)	772
44 (Rep. Mustio)	446
45 (Rep. Kulik)	48
46 (Rep. Ortitay)	165
47 (Rep. Gillespie)	1,313
48 (Rep. O'Neal)	63
49 (Rep. Cook)	670
50 (Rep. Snyder)	136
51 (Rep. Dowling)	248
52(Rep. Warner)	238
53 (Rep. Godshall)	1,110
54 (Rep. Evankovich)	1,279
55 (Rep. Petarca)	522
56 (Rep. Dunbar)	39
57 (Rep. Nelson)	110
58 (Rep. Walsh)	111
59 (Rep. Reese)	384
60 (Rep. Pyle)	279
61 (Rep. Harper)	1,063

District	Clean Energy Jobs
62 (Rep. Reed)	406
63 (Rep. Oberlander)	298
64 (Rep. James)	327
65 (Rep. Rapp)	282
66 (Rep. Dush)	407
67 (Rep. Causer)	217
68 (Rep. Clint)	768
69 (Rep. Metzgar)	297
70 (Rep. Bradford)	957
71 (Rep. Barbin)	381
72 (Rep. Burns)	210
73 (Rep. Sankey)	303
74 (Rep. Lewis)	389
75 (Rep. Gabler)	368
76 (Rep. Hanna)	1,057
77 (Rep. Conklin)	63
78 (Rep. Topper)	500
79 (Rep. McGinnis)	708
80 (Rep. Ward)	65
81 (Rep. Irvin)	160
82 (Rep. Harris, A)	620
83 (Rep. Wheeland)	691
84 (Rep. Everett)	247
85 (Rep. Keller, F)	318
86 (Rep. Keller, M)	477
87 (Rep. Rothman)	1,065
88 (Rep. Delozier)	199
89 (Rep. Kauffman)	516
90 (Rep. Schemel)	16
91 (Rep. Moul)	668
92 (Rep. Keefer)	396
93 (Rep. Hill)	587
94 (Rep. Saylor)	64
95 (Rep. Hill-Evans)	<10
96 (Rep. Sturla)	<10
97 (Rep. Mentzer)	<10
98 (Rep. Hickernell)	322
99 (Rep. Zimmerman)	127
100 (Rep. Cutler)	182
101 (Rep. Ryan)	659
102 (Rep. Diamond)	104
103 (Rep. Kim)	1,034
104 (Rep. Helm)	454

STATE HOUSE CONTINUED

District	Clean Energy Jobs
105 (Rep. Marsico)	<10
106 (Rep. Mehaffie)	<10
107 (Rep. Masser)	726
108 (Rep. Culver)	48
109 (Rep. Millard)	152
110 (Rep. Pickett)	311
111 (Rep. Fritz)	620
112 (Rep. Haggerty)	894
113 (Rep. Flynn)	445
114 (Rep. Kavulich)	135
115 (Rep. Madden)	623
116 (Rep. Toohil)	593
117 (Rep. Boback)	351
118 (Rep. Carroll)	472
119 (Rep. Mullery)	542
120 (Rep. Kaufer)	24
121 (Rep. Pashinski)	97
122 (Rep. Heffley)	302
123 (Rep. Goodman)	338
124 (Rep. Knowles)	234
125 (Rep. Tobash)	216
126 (Rep. Rozzi)	405
127 (Rep. Caltagirone)	40
128 (Rep. Gillen)	388
129 (Rep. Cox)	63
130 (Rep. Maloney)	255
131 (Rep. Simmons)	875
132 (Rep. Schlossberg)	525
133 (Rep. Mc.Neill)	761
134 (Rep. Mackenzie)	263
135 (Rep. Samuelson)	151
136 (Rep. Freeman)	416
137 (Rep. Emrick)	334
138 (Rep. Hahn)	309
139 (Rep. Peifer)	287
140 (Rep. Galloway)	759
141 (Rep. Davis, T)	102
142 (Rep. Farry)	615
143 (Rep. Quinn)	1,234
144 (Rep. Watson)	80
145 (Rep. Staats)	24
146 (Rep. Quigley)	206
147 (Rep. Toepel)	127

District	Clean Energy Jobs
148 (Rep. Daley)	1,287
149 (Rep. Briggs)	1,184
150 (Rep. Corr)	24
151 (Rep. Stephens)	655
152 (Rep. Murt)	452
153 (Rep. Dean)	382
154 (Rep. McCarter)	183
155 (Rep. Corbin)	471
156 (Rep. Comitta)	2,203
157 (Rep. Kampf)	396
158 (Rep. Roe)	333
159 (Rep. Kirkland)	605
160 (Rep. Barrar)	56
161 (Rep. Krueger-Braneky)	946
162 (Rep. Miccarelli)	469
163 (Rep. Santora)	692
164 (Rep. Davidson)	<10
165 (Rep. Charlton)	430
166 (Rep. Vitali)	<10
167 (Rep. Milne)	<10
168 (Rep. Quinn)	17
169 (Rep. Klunk)	55
170 (Rep. White)	232
171 (Rep. Benninghoff)	32
172 (Rep. Boyle)	502
173 (Rep. Driscoll)	<10
174 (Rep. Neilson)	<10
175 (Rep. O'Brien)	2,295
176 (Rep. Rader)	153
177 (Rep. Taylor)	168
178 (Rep. Tai)	79
179 (Rep. Dawkins)	207
180 (Rep. Cruz)	<10
181 (Rep. Thomas)	72
182 (Rep. Sims)	2,099
183 (Rep. Mako)	168
184 (Rep. Keller, W)	225
185 (Rep. Donatucci)	96
186 (Rep. Harris, J)	72
187 (Rep. Day)	813
188 (Rep. Roebuck)	96
189 (Rep. Brown, R)	32
190 (Rep. Brown, V)	72

STATE HOUSE CONTINUED

District	Clean Energy Jobs
191 (Rep. McClinton)	<10
192 (Rep. Cephas)	24
193 (Rep. Tallman)	368
194 (Rep. DeLissio)	289
195 (Rep. Bullock)	<10
196 (Rep. Grove)	8
197 (Rep. Vazquez)	<10

District	Clean Energy Jobs
198 (Rep. Youngblood)	57
199 (Rep. Bloom)	<10
200 (Rep. Rabb)	<10
201 (Rep. Kinsey)	32
202 (Rep. Solomon)	<10
203 (Rep. Fitzgerald)	<10

ENDNOTES

1 Unless otherwise stated, all data is from the 2018 U.S. Energy & Employment Report (USEER) released in May 2018 by the National Association of State Energy Officials and the Energy Futures Initiative. Visit www.usenergyjobs.org to download USEER and see pages 15-17 for methodology questions. This fact sheet differs from previous reports released by E2 in Pennsylvania as the methodology has been adjusted to more accurately count the number of clean energy workers in the state. For more questions regarding methodology, visit www.e2.org/cleanjobsamerica/FAQ.

2 http://keealliance.org/act-129

3 http://programs.dsireusa.org/system/program

4 http://rggi.org/docs/ProceedsReport/RGGI_Proceeds_Report_2015.pdf.

PRESENTED BY:

E2 is a national, nonpartisan group of business leaders, investors and others who advocate for smart policies that are good for the environment and good for the economy.

Clean Jobs Count is a campaign to raise awareness of the economic importance of the clean economy. Visit www.cleanjobscount.org to join thousands of business leaders, workers and others to tell lawmakers and policymakers that clean jobs count.

IN PARTNERSHIP WITH:

The Keystone Energy Efficiency Alliance (KEEA) is a non-profit, tax-exempt 501(c)(6) corporation dedicated to promoting the energy efficiency and renewable energy industries in Pennsylvania.

The Sustainable Business Network is a community of local businesses and individuals committed to building a just, thriving and sustainable economy in the Greater Philadelphia region.

Sustainable Pittsburgh affects decision-making in the Pittsburgh region to integrate economic prosperity, social equity, and environmental quality as the enduring accountability, bringing sustainable solutions for communities and businesses.

Green Building Alliance (GBA) advances innovation in the built environment by empowering people to create environmentally, economically, and socially vibrant places.